

The Chemical Nature of Matter

7-5 The student will demonstrate an understanding of the classifications and properties of matter and the changes that matter undergoes. (Physical Science)

7-5.3. Compare the physical properties of metals and nonmetals.

Taxonomy level: 2.6-B Understand Conceptual Knowledge

Previous/Future knowledge: In 5th grade (5-4.2), students compared physical properties of states of matter. Students have not been introduced the concept metals and nonmetals in previous grade levels. Students will further develop the concepts of metals and nonmetals in high school Physical Science (PS-2.3)

It is essential for students to know that metals and nonmetals are two major groups of elements that have different physical properties.

Physical properties of metals include:

- *Luster*—Having a shiny surface or reflecting light brightly
- *Conductors*—Heat and electricity move through them easily
- *Malleable*—Ability to be hammered into different shapes
- *Ductile*—Ability to be drawn into a wire
- *High density*—Heavy for their size

Physical properties of nonmetals include:

- *Dull*—Not shiny
- *Nonconductors*—Heat and electricity do not move through them easily
- *Brittle*—Break or shatter easily (solids)

It is not essential for students to know the chemical properties of metals versus nonmetals, or the electron arrangement in atoms of metals versus nonmetals.

Assessment Guidelines:

The objective of this indicator is to *compare* the physical properties of metals and nonmetals; therefore, the primary focus of assessment should be to determine the differences between metals or nonmetals based on their physical properties. However, appropriate assessments should also require students to *infer* from a list of physical properties whether an object is metal or nonmetal; *recall* physical properties of metals and nonmetals; or *summarize* physical properties of metals and nonmetals.